PCB Etching Using Toner Transfer Method

Written By: Robot Platform

TOOLS:

- Clothes Iron (1)
- Electronic or Hand Driller (1)
- Fine Drill Bits (0.5mm and 1mm) (1)
- Hacksaw (1)

PARTS:

- Copper Board (1)
- Laser printer (1)
- Fine sandpaper or Kitchen Scrubber (1)
- Muriatic Acid / Hydrochloric Acid (HCL) (1)
- Hydrogen Peroxide (H2O2) (1)
- Thinner / Acetone (1)
- Plastic container (1)
- Circuit diagram (1)

SUMMARY

What is the fun in making robots if you can't make your own circuit boards? This PCB etching tutorial describes a step-by-step process to MAKE your own circuit board. There are many tutorials already available on etching. Each method uses different materials and I have used hydrochloric acid and hydrogen peroxide. Did you read acid? Be careful. If you are

cautious, you can expect great results. If you abuse these chemicals, they might turn dangerous.

For a detailed tutorial with more pictures including a video tutorial, go here.

Step 1 — Introduction to PCB etching using laser printer
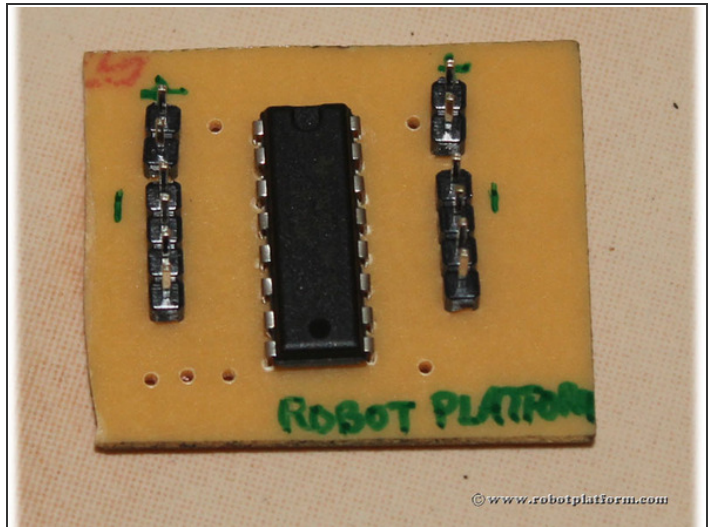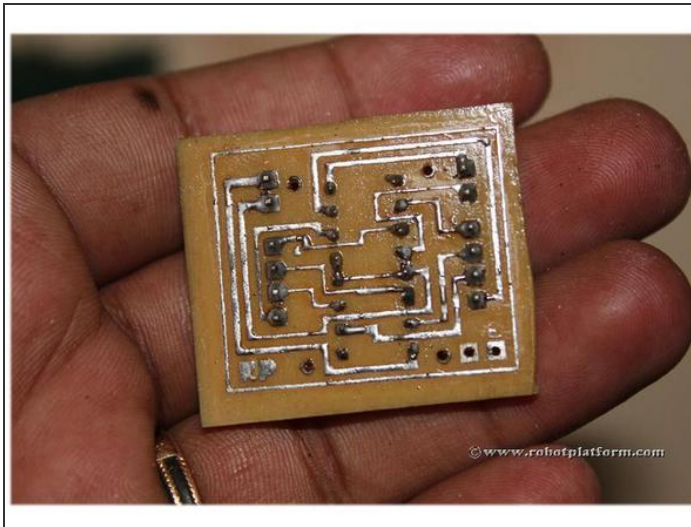
- Etching is a technique used to quickly make professional looking PCB's with limited resources. This technique is excellent for both through-hole components and surface-mount devices, and the copper tracks can be as thin as 8mil to 10mil.

Step 2 — Paper Selection

- Glossy photo-quality paper can be used for etching. I have always succeeded in using glossy magazine sheets which are cheap and widely available. Just make sure that the sheet is glossy and thick

Step 3 — Printer Selection & Setup

- Use a laser printer as inkjet printers are almost useless for this task.

- Set the printer to its highest toner output, i.e., set the printer to print with highest contrast possible.

- Once everything is set, print your favorite circuit on the glossy paper.

Step 4 — Preparing the copper board
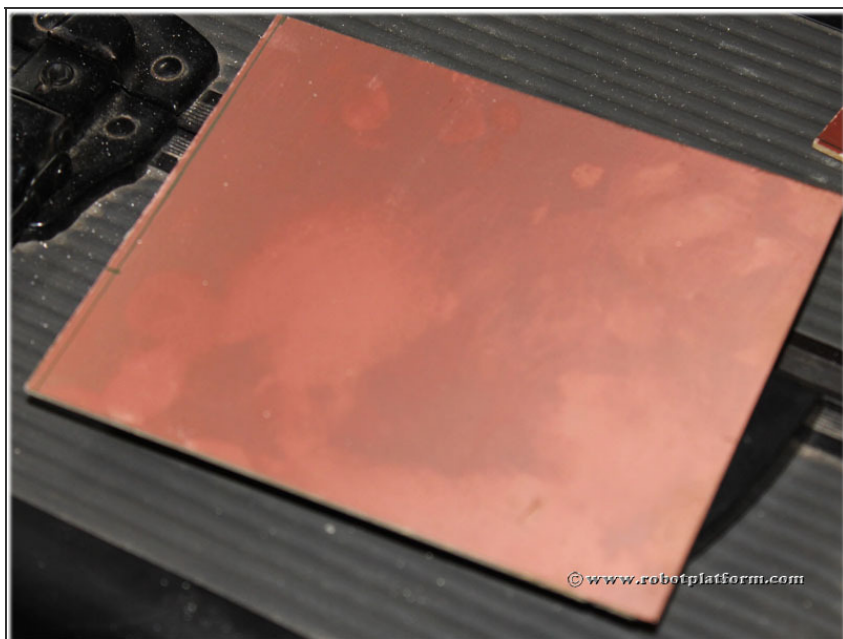
- A normal copper board available in your radio shop should be good for this task.

- Use a kitchen scrubber or a fine sandpaper and sand the copper. Do not overdo it.

- Never over-scrub it such that you remove the entire copper layer.

- Clean the surface with a cloth. Do not touch the surface once the cleaning is done.

- If you are you are using a double sided copper board, then be sure to scrub the other side as well. This will speed up the etching process of the other side.

Step 5 — Transferring Toner from Paper to Board
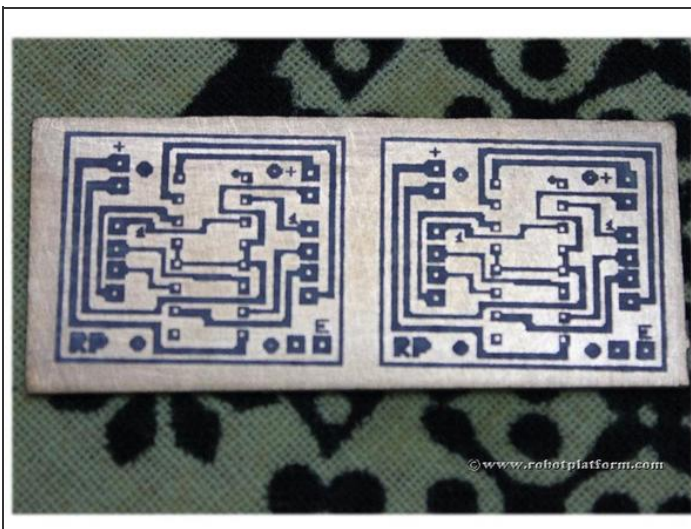
- Now that the board and the print are ready, switch on your clothes iron to the maximum heat and leave it for a minute or two.

- Align the printed paper on the copper board with the printed side over the board.

- Applying a bit of pressure, carefully move the iron on the paper for 2 - 3 minutes.

- If you have long lines in your PCB, they tend to not get transfered completely. **Bolster the lines on your copper board.**

- To bolster the line, you can trace that line with a sharpie or a paint pen(works better). **if you have a black electrical tape, you can use that as well. Cut it really thin(as thick as the line) and cover the line with the tape**.

Step 6

- Etching Process

- Drop the board into water and carefully peel off the paper and you should see the print on the board. If the paper does not peel off easily, remove it by rubbing it slightly.

- Prepare the etching solution with hydrogen peroxide and hydrochloric acid in a ratio of 3:2.

- Gloves and eye protection are recommended!

- Drop the board into the solution and wait for a couple of seconds.

- When the fine tracks are clearly visible and the unwanted copper removed, take the board out and clean it in water.

Step 7 — Removing Toner from Board

- Removing the toner is a simple task. If you have any acetone- or alcohol-based products, then use one of them to rub off the toner from the board.
  - Methanol is slightly more acidic than water. Don't apply methanol for the last solution.
- I used deodorant and a toothbrush which was readily available and .... wow... it worked like magic.
- To prevent copper from going bad, you can apply anti-rust to the PCB.

Step 8 — Drilling

- Etching is done and you have a printed circuit board in hand.
- To add components, use a driller and drill tiny circular holes wherever necessary. This is to plug in those electronic components.
- Drill bits are really tiny. Handle them with care.
- Some people drill before they take the toner off the copper.
- Get a mask if you can, drilling makes many tiny particles.

Step 9 — Adding Components & Soldering
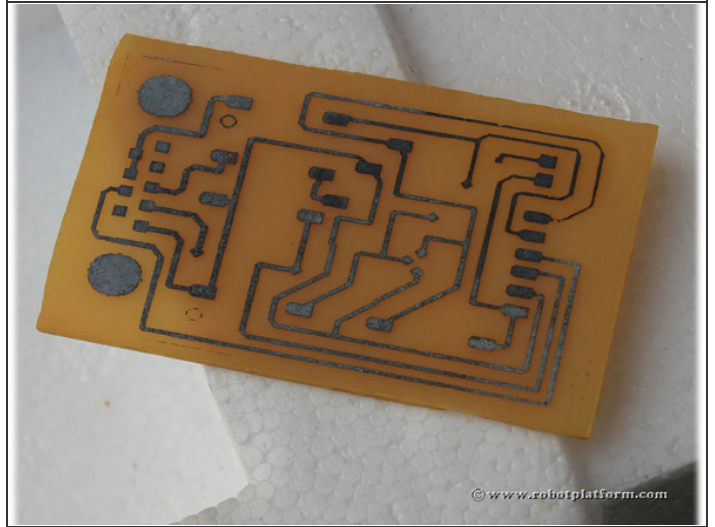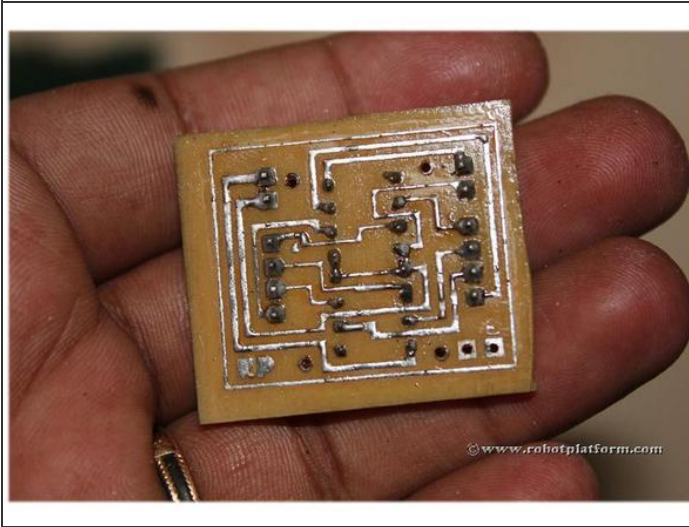
- You are done. Plug in those electronic components and solder them.
- You can also run the solder across those copper tracks to avoid oxidation.

Etching is an easy technique and once you are good with it, I'm sure you will say goodbye to wires and perfboards. Try it out and let me know if you succeed.

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